OCT 89

ZX-Appeal

vancouver sinclair users group

next meeting:

KILLARNY COMMUNITY CENTRE
6260 KILLARNY STREET
VANCOUVER

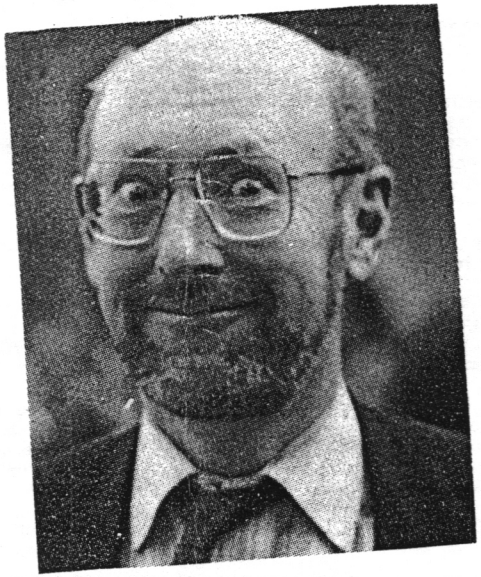
FRIDAY; 7:00PM

October 13/89

ZXAppeal is a monthly newsletter put out by the Vancouver Sinclair Users Group. For more information on the group and ZXAppeal see the backcover.

inside

would you buy a used computer from this man?



THIS ISSUE.....

Better late than never! You were probably wondering what happened to the SUMMER MEGA ISSUE as well as the regular September issue. The newsletter didn't come out due to the lack of submissions of original material. We had a couple of articles from members but not enough for a full issue. This issue is still light on original material but I've filled it out with items from the "reprint" file as well as other items scrounged from here and there. As I've said before, I'm not a magician so can't make stuff for the newsletter out of thin air. With that said, I want to make it clear that I can only put out an issue of the newsletter if you give me stuff to share with the other members. So if the newsletter doesn't appear in your mailbox it was because no one had anything to share.

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LIBRARIAN WANTED: Bill Rutter has advised that he will not be able to continue as the club 2068 librarian after January. Anyone interested in looking after this library please let Gerd know. It has been mentioned that as we have a disk system for the 1000 library it is only logical that we get one for the 2068 library as well. Let's talk about this suggestion at the next meeting. As a very pleased owner of a Larken system I recommened this system highly. It appears to be the standard DD system in use. Of course, the 2068 librarian would need to keep this system at his home.

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ELECTION TIME: Just a reminder, the club Annual Elections are coming up during the October meeting. Refreshments will be served - we'll get some sandwiches, coffee, etc, in. It looks like all the serving members will be standing for re-election. Anyone not attending the meeting is automatically nominated for a position.

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BITS & PIECES.....

...you might remember Glenn told us he could lay his hands on used, uncased, RGB monitors at $75 each. I can report these monitors work beautifully and can be connected directly to the QL, requireing only the addition of a new connector plug, or a 2068 equipped with an RGB board. With a little tweaking of the picture size the results are perfect. The one I picked up had no sign of screen burn as some surely will have at that price.

...my QLVision monitor is now seeing duty connected to my 2068. If you're as sick of the screen 'crawl' on your 2068 as I was then RGB is for you. I had Dan Elliot whip me up Tim Stoddard's RGB board from Time Designs magazine last summer issue. The colour of a 2068 on an RGB monitor is superb!!! I always said that colour monitors were a waste of money but after seeing this I'm never going back to green screen or even composite colour. If you're interested in any of Dan's work see his notice printed within.

...the word is that RMG Enterprises is in the final stages of securing the production and distribution rights to all of the house software titles from Zebra Systems.

...NASA, the space people, have a BBS set up especially for educators. The system has main memory of 14 meg and disk memory of 700+ meg and can answer 8 callers simultaneously at 300, 1200, or 2400 baud. The article describing all the features is 4 pages long so let's just say it offers everything you might want in the way of info about past, present, and future space exploration. All the files can be down-loaded via direct disk capture or XMODEM transfer. Call 205-895-0028 and use 8/none/1. To log-on the first time enter the Username NEWUSER and the password NEWUSER. After you answer a few first-time user questions you will be asked to assign yourself a personal USERNAME and PASSWORD for future use. One more thing - IT'S FREE!!! Just pay the long-distance charges.

...we've received a copy of "The Unofficial Master Guide To The LARKEN ZX81/TS1000 DISK SYSTEM" by Bill Harmer of Ottawa for the club library. Bill authors, on a semi-periodical basis, a number of very readible bulletins full of items of goings-on in the world of Timex and Sinclair as well as articles on other interesting computer stuff past, present, and future.

...the Pacific Coast Computer Fair Association advises the 1989 Pacific Coast Computer Fair will take place on October 21 again at the McPherson Centre in Burnaby. I'm sure we'll organise a User Group table as in past years. This year there will also be a speakers session with speakers from the likes of APPLE, XEROX, and MICROSOFT.

...while at the CATS fest in Washington I was chatting with Jack Dohany and, knowing Jack's preoccupation with the search for the perfect word processing program for the 2068, mentioned to him my very favourable thoughts on the Spectrum program 'Wordmaster' which I've mentioned and demoed here before (and am using to create this text). I supplied Jack with a review copy when I got back. Recently Jack both called and wrote to me thanking me for introducing him to 'Wordmaster' as he thinks it is one of the best programs to ever be written for our machines. After upgrading MScript as far as it would go, Jack was planning to write his own WP program incorporating all the features he felt necessary in a word processor but after looking over Wordmaster he has shelved that project. He says "why should I spend two or three years writing something that essentially already exists?". Jack has written a lengthy article for Time Designs about Wordmaster and is presently negotiating a contract with the authors to distribute Wordmaster in North America.

...the rumour is the U.S. gov't is upset with the Far East manufacturers of 5 1/4 inch floppies and is considering imposing a duty to combat what they see as "dumping" by the manufacturers. Remember what happened to the price of RAM chips when the U.S. gov't imposed a quota for the same reason?

...if you subscribe to National Geographic Magazine, look at page 707 of the June/89 issue. Does the name of the computer in the picture seem familiar?

...it is reported in the British computer press that QL microdrive cartridges will not be produced after the end of the year and maybe a lot earlier if the German tape manufacturer stops supplying tape.

...the August issue of the Sinclair Milwaukee Users Group newsletter announced that SMUG intends to host a Midwest TS 'Fest on the 1st, 2nd, & 3rd of June, 1990!! More details will be announced but the

venue is almost finalized with the room rate to be $45 a night per room with each room sleeping up to 4 persons.

...the Chicago Area T/S Users newsletter reports that a member has successfully adapted a TS1016 rampak to function on a TS2068 being mapped into banks 5 & 6. Hope we hear more about this "re-cycling" of old TS stuff.

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NEW MEMBERS:

Bob Barnett, Fort Myers, Florida
Bob Verge, Vancouver, B.C.
Ron Cavin II, Columbus, Ohio
Alvin Albrecht, Calgary, Alberta
Don Zarling, Fifield, Wisconson

RENEWING MEMBERS:

Hilda McKinnon, John Sampson, Doug Jeffery, Tim Woods, Ike Walker, Jon Kaczor, Charles Byler, Kenton Garrett, Mel Richardson, Ian Robertson, Seward Warner

MEMBERSHIP: 65 members including 17 up for renewal

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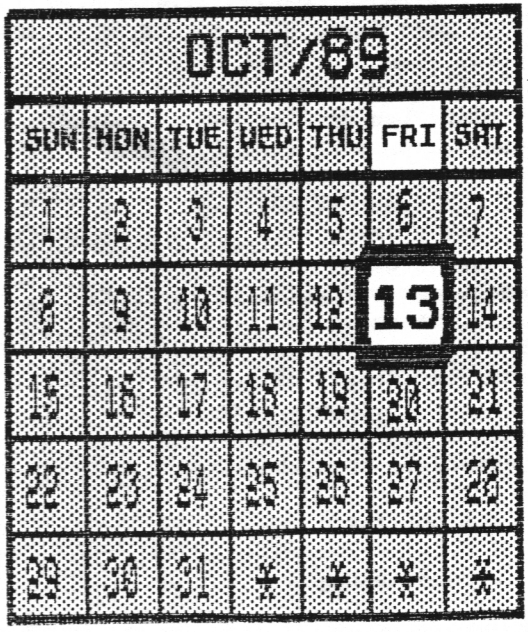
"How I Got My Ramdisk Ram Chips" or "Do You Wanna Make A Deal?"

When I picked up my RGB monitor from Glenn I also picked up one for VSUGer Dan on the Island. When considering how best to pack this quite fragile item I thought of the 'Flashpak' stores and their method of foaming an item in place. With that in mind I bought a can of expanding insulation foam from Lumberland and proceeded to make a bed o' foam for the monitor. It quickly became very evident that you don't get much foam for 10 bucks these days. I calculated less than half a cubic FOOT of foam. Feeling somewhat ripped-off I made my displeasure very plain to the manufacturer. After being told they would make it up to me, I received a notice in my door from a cartage company regarding a shipment coming for me. They would bring it staight over if I would just call. Dropped at my door were FOUR CASES of the stuff. At 10 bucks a can times 12 cans a case times 4 cases - that's $480 worth of cans of foam!! Having absolutely no need for this much of the stuff I asked around and was able to sell 40 cans of it for $4.50 a can to a hardware store chain.That's $180 bucks!! Now for the RAM chip part of the story. I'd asked about the price of 32K chips some months ago and was told the local price was $27-$32 each. I asked around again now and found the price now to be $42-$60 EACH!!! And I wanted 6! I called Larry Kenny and asked if he had a source for these chips and he put me on to Curtis Ibarra in San Diego. Curtis said he'd stocked up when prices were lower and would let me have 6 for $20US each which is $120US times 1.2 exchange making a total of $144 which left me with 36 bucks from my wheeling and dealing.

****

...meeting date!

remember - don't have supper as there'll be some food laid on for the meeting!!



MESSAGE FROM YOUR PRESIDENT

Another year has gone by since the last one, wherefore it is time to announce the:

1989 ANNUAL GENERAL MEETING

to be held on October 13, 1989.

AGENDA

Call to Order
President's Report
Vice President's Report
Treasurer's Report
ELECTIONS OF OFFICERS
Editor's Report
Hardware SIG Report
Librarians' Reports
Other Business

The election date was set by the membership during our April 14 meeting this year. The following is a reprint of my comments on the election as published in your Mar/Apr'89 ZX-APPEAL:

"On this occasion I would like to paraphrase a well known quotation from the Inaugural Speech of the late U.S. President, John F. Kennedy: 'Do not ask what your club can do for you - ask what you can do for your club !' Please take it to heart, participate in the next A.G.M. and consider holding office (it's only for a year, i.e. my job is up for grabs). Since due to Rod's thrifty management our kitty is in such a good shape, I suggest that people who hold club office be exempt from dues for the term of their office as an added incentive. Without more active participation I fear our club is in danger of dwindling into oblivion."

See you at the meeting,

Gerd Breunung

MINUTES: 9 JUNE '89

The minutes this month brought to you by your 'Stand-In' Scribe, Ye Olde Regular Scribe being absent, so please don't flame me if it's not up/down to the usual standard. This was the last meeting before the summer break and opened with lots of discussion of various projects, past, present and future. After everyone eventually quieted down, Gerd gave his President's report. This included an interesting discussion by Gerd of his recent work at work with AutoCAD on his work AT. He told how his fellow workers carried out some sort of strange ritual (was his drafting board sent to a museum?). I saw this AutoCAD program recently and was very impressed.

Vice-President / Stand-in Scribe, gave the V/P's report, and we talked about the possibilities of those Nielsen ratings cameras that watch you watching it.(The T.V. that is). Shades of Big Brother.

Then Rod, wearing his Treasurers' hat, reported that we have 1200 loonies in the Credit Union. Rod, then as Editor, discussed Vince's excellent work in upgrading the ZX81/TS1000. Vince reported there will be a further advancement to his existing revision. No 2068 articles this month - more stuff needed for the newsletter!! Regarding the newsletter, the very improbable happened for the second month running with the short delivery time of the above via Canada Post !!! Rod's complaints must be finally paying off.

Marcio Vieira wants to know if anyone has seen advertisements for a two machine master/slave TS1000 system, where one machine is in compute mode while the other is in permanent display mode giving fast flicker-free graphics. Anyone who knows anything please give Rod or Marcio a call.

We then entered into the main part of the meeting, where Rod gave a slide presentation of his and Gerd's recent visit to the CATS 'FEST in Washington D.C. This included very interesting pictures in the Smithsonian and around the Capital itself. Rod and Gerd both agreed they had a great time and CATS group members were very hospitable. And with that, as the Scribe would say, the meeting dissolved into disorder and merriment.

Hope you all had a very good summer.
Glenn (Official Stand-In Scribe).

SEPT MINUTES: were not taken as the meeting was informal but it is reported that the 10 bods who showed up had a good time with much spirited discussion

SCIENCE OF CHAOS

Al Albrecht

Nova put on an interesting show about the Science of Chaos a month ago and a scientist used one experiment that stuck in my mind to explain that chaos was not chaos at all but "ordered" chaos. I thought what he was saying was blasphemous so I made the computer do the same experiment.

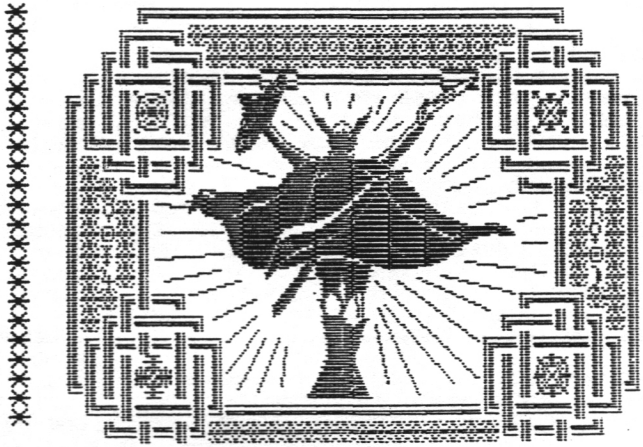
Here is a brief explanation of the experiment along with a short listing for the 2068.

Three points labelled A-C were plotted on a sheet of paper to form a triangle. Another point at random was chosen on the paper (it did not have to be inside the triangle). Then, a die was rolled. A roll of 1 or 2 corresponded to vertex A, 3 or 4 meant vertex B, and 5 or 6 by elimination was vertex C.

The experimenter then plotted a point on the paper that was the midpoint of the vertex chosen by the die roll and the last point plotted. What was expected if the experiment persisted was a whole mess of dots all over the place. And that's what should have happened.

```
   1 REM ***SCIENCE OF CHAOS***
by Al Albrecht, Calgary, Alberta
---inspired by the NOVA program
of the same name.
   2 REM To display the full
results of the program let it
run for an hour or more.
   5 DEF FN m(a,x)=INT (a+x)/2
  10 INK 0: PAPER 7: BORDER 0: C
LS
  15 PRINT PAPER 0, INK 4,TAB 8;
"SCIENCE OF CHAOS";,,
  20 PRINT AT 4,14;"3/4";AT 20,0
;"1,2";AT 20,29;"5,6"
  25 PLOT 24,8: DRAW 207,0: DRAW
 -104,127: DRAW -103,-127
  30 PRINT #0;AT 0,0; INK 6;"MOV
E PIXEL TO ANY POINT AND     PRE
SS 0.  USE 5-8"
  35 LET x=127: LET y=71
  40 PLOT x,y
  45 LET g$=INKEY$: IF (g$<"5" O
R g$>"8") AND g$<>"0" THEN GO TO
 75
  47 PLOT INVERSE 1;x,y
  50 IF g$="0" THEN GO TO 75
  55 LET x=x+(g$="8")-(g$="5")
  60 LET y=y+(g$="7")-(g$="6")
  65 IF POINT (x,y) THEN LET x=-
(g$="8")+(g$="5"): LET y=y(g$="6
")-(g$="7")
  70 GO TO 40
  75 PRINT #0;AT 0,0,,,,
  80 LET roll=INT (RND*6)+1
  85 LET a=(24 AND roll<3)+(127
AND (roll=4 OR roll=3))+(231 AND
 roll>4)
  90 LET b=(8 AND (roll<3 OR rol
l>4))+(135 AND (roll=3 OR roll=4
))
  95 LET x=FN m(x,a): LET y=FN m
(y,b): PLOT x,y
 100 GO TO 80
```

see the results of this program on page 9.



Applying the ZX-Assembler

by V. Lee

Programming in machine language on the ZX81/TS1000 is not as difficult as it seems if you have the right tools. A kit should include a hex/dec calculator, a program known as an assembler and a reference manual for Z80 machine code.

In general when you are programming in BASIC, you are dealing with the decimal number system. This is what we use for counting. It is based on powers of tens using digits 0 to 9. But in machine language, the hexadecimal system is used. This system represents how data is stored in a computer. It is based on powers of 16 and it contains digits from 0 to 9 and then A to F. The tricky part comes in switching between machine language and BASIC much like miles per hour and kilometers per hour. The quantites are the same from different perspectives but if the conversion is inaccurate then the result is inaccurate.

There are various methods for converting decimal numbers to hexadecimal, but nothing works better than a calculator that can do the conversion. One that can also convert to the binary system is even better. Reguardless of which numbering system you are using, the data ends up as a binary pattern in the computer.

Programming in machine language means talking directly to the "brain" in the computer which in this case is the Z80 CPU. This chip recognizes certain binary patterns as instructions which it will execute. When they are arranged in a certain sequence in memory, the CPU can be directed to perform specific tasks.

You may have seen articles that have set up a machine language program by poking the hex code or decimal code into a REM statement. (The REM statement is used to reserve space to store the code.) This would be a hard way to learn programing. There are just too many instruction codes to remember. Since these instructions have names, what if we had a program in which we could just list the names of the instructions we wanted to use and it would "assemble" which codes to put in a REM statements. And calculate the hex/dec conversions and address locations. This is exactly what an Assembler does. One of my favorites is the "ZX-Assembler" or as it is also refer to as the "Artic Assembler". It will be used to generate all of examples you see in these articles.

But before you can begin programming, you need to know what instructions are available. A good reference guide is "Mastering Machine Code on your ZX81" by Toni Baker. (This book was later reprinted with the title change from "ZX81" to "Timex Sinclair 1500/1000"). It also gives examples of how to write programs and how to use some of the ROM routines.

One hint which I found very useful, was to make a list of every instruction which I felt I would use, into its group and sub-group so that I would know exactly what was available. Unlike BASIC where you have almost unlimited variables to use, machine code restricts certain instructions to certain registers. The five main instruction groups are the data transfer, arithmetic, logical, branch and I/O (and control). The sub-groups are the use of the registers with each instruction.

The secret to machine language programming is "subroutines". They are small "building blocks" written to perform specific chores. In this word processor program which produced this article for example, one subroutine would print to the screen, another would scan the keyboard and another would organize the data. Put them all together and you have a useful program.

Subroutines also use up less memory and make programming faster. Just like in BASIC where you have GOSUB and RETURN, similar instructions exist in machine language to allow you to reuse routines in different parts of a program without having to duplicate the code. Once a subroutine has proven itself to work, it can be used to develope other programs. And options can easily be changed just by changing the routines.

This is the whole theme behind this continuing article. Subroutines and programming techniques will be develope to put in our "recipe box". I should also mention that both the Assembler and the "Mastering Machine Code" book are available from the club library. With that in mind, let's begin.

One of the simplest ROM routines we can use, is one that prints a character to the screen. LoaD the character's hex code in register A. Issue the RST 10 instruction and the character will be printed to the first available spot. We are going to expand this routine so that it will automatically accept whole lines of characters. Some simple programming techniques will be used, pointer, loop and parameter passing.

Remember back in the early days of school when the teacher would write some letters on the blackboard. She (or he) would then get the students to recite them one by one by pointing to a letter with a

pointer. This is exactly how this new routine will work. First we set aside a place in memory to store some characters. A register pair will be used as a pointer. The routine will run in a continuous loop until all the characters have been printed by the ROM routine. We probably have to set up the environment before the routine can be CALLed in to do its job. This is known as parameter passing.

Remember back in the early days of school when the teacher would write some letters on the blackboard. She (or he) would then get the students to recite them one by one by pointing to a letter with a pointer. This is exactly how this new routine will work. First we set aside a place in memory to store some characters. A register pair will be used as a pointer. The routine will run in a continuous loop until all the characters have been printed by the ROM routine. We probably have to set up the environment before the routine can be CALLed in to do its job. This is known as parameter passing.

The Assembler has a lot of nice options to make the programming easier and understandable. Let's take a look at the program listing. The names on the left are called labels. They can be used as variables to make the listing easier to follow or they can be used to identify the purpose of the instructions in the next column. Semicolons allow comments to be placed without affecting the program. Hex codes can be manually inserted and characters found inside of quotes are automatically converted into their hex code as you see in the section marked WORDS. Notice that the assembled HEX codes for the program has not been included with the listing. That is an area for the assembler to worry about, not us.

PRNT is the subroutine which does all the work. There is a box called a header at the beginning explaining what this routine does and how to use it. It explains that it will only print the normal character set, not the expanded keyword set. The expanded set will cause the routine to crash. But before this routine can be CALLed in for use, the HL register must point to the memory location containing the first character to be printed. In addition, if this routine encounters 76 HEX in its data, it will move the printing position to the beginning of the next line on the screen. (This is a feature of the ROM RST10 routine.) And if it encounters FF HEX, it will be signaled that all of the characters have been printed. There is warning that both the "A" and HL contents will be altered. If different subroutines are using the same registers in a program, they must be protected from being erased if the contents are important.

Usually there is also an explanation on which instruction to use to access the routine. But since all of our routines will be accessed with the CALL instructions and exited with the RETurns, I decided to leave this bit of information out.

Let take a look of what PRNT does. The contents pointed to by HL is LoaDed into the A register. We then Compare to see if this character is the end marker. If it is, we exit the routine with the RETurn if Zero instruction. If it is not, we continue on and print the character with the ROM routine. We then move the pointer to the next character with the INCrement HL instruction and then "jump" back to the beginning for the next character completing the loop.

The program begins at the START where we set up the parameters. The LoaD command "moves" the HL pointer to the memory location, WORDS which contains the letters and the special control characters. Then we CALL on our subroutine and finally we exit the program back to BASIC with the RETurn instruction. Isn't that simple.

```
        ;----- INITIALIZE ------;

PRNTA=10
ENDM= FF
        ;------- START ---------;

START LD HL,WORDS ;SET POINTER.
      CALL PRNT   ;PRINT WORDS.
      RET         ;

WORDS "THIS IS AN EXAMPLE"
      76

      "OF PRINTING WITH RST 10"
      76 76

      1D 00 BC 00 BC 00 BC 00
      BC 1D 76
      1E BC 00 BC 00 BC 00 BC
      00 1E 76

      FF

      ;-----------------------;
      ;         PRNT          ;
      ;-----------------------;
      ;THIS ROUTINE WILL PRINT;
      ;A STRING OF UNEXPANDED ;
      ;CHRS. TO THE SCREEN.   ;
      ;                       ;
      ;HL    POINTS TO DATA.  ;
      ;      REG. IS ALTERED. ;
      ;"76" PRODUCE LFEED/CR. ;
      ;"FF" END MARKER.       ;
      ;                       ;
      ;A     REG IS ALTERED.  ;
      ;-----------------------;

PRNT  LD A,(HL)  ;GET CHAR.
      CP ENDM    ;QUIT IF IT
      RET Z      ; IS THE END.
      RST PRNTA  ;PRINT IT.
      INC HL     ;UPDATE POINTR.
      JR PRNT    ;GO GET NEXT
                 ; CHARACTER.
```

SINCLAIR SCENE

Microdrive spotting

Sinclair must have sold millions of microdrive cartridges to Spectrum, QL and One Per Desk users in the last five years. The design has changed several times, and new cartridges are substantially more reliable than the original ones. Every cartridge is date-stamped when it is made, yet few users know how to tell the age of a tape.

If you pull the cartridge out of the box you should see four digits embossed in the plastic near the cushion that holds the tape against the drive head. The code is very simple, once you know it – the numbers tell you the day and year when the cartridge was manufactured by Ablex in Telford.

The first three digits are the number of days since the beginning of the year, and the last digit is the year from 1980. In other words, a tape manufactured on 1st February 1988 would be marked '0328', as January has 31 days. If you can't read the number, try turning it the other way up – Ablex is not consistent.

The main events in the history of the microdrive cartridge were design changes in mid-1984, 1985 and 1987. In 1984 Sinclair changed the plastic moulding so that any excess plastic on the moulding ended up outside the cartridge, rather than inside, in the cramped company of 20 feet of narrow continuously-looped tape.

Plastic mouldings usually have a smooth side and a rough side – where the plastic was originally injected. Up until then, Sinclair had injection-moulded computers and calculators, which must look smooth on the outside but can have any amount of cack on the inside. But microdrive cartridges contain moving parts, so they need to be smooth on the inside!

Cartridges made from the middle of 1984 onwards sound and work better; you can tell later ones at a glance from the text RGD. DESIGN APP. embossed near the number. Older tapes don't have this message – at least, they definitely don't have it on the outside!

A year later the moulding was changed again. The part of the cartridge that covers the tape at the top left side was affected, near to the roller wheel clearly visible inside the cartridge. The new moulding meets the tape at a diagonal, rather than at right-angles. This reduces the risk of creasing while inserting the cartridge, but may cause loops to form when the cartridge is taken out of the drive.

In 1987 ICL persuaded Ablex to beef up the spring behind the tape cushion. Later tapes have a much wider copper spring holding the tape against the drive head, which makes them more reliable. It was not uncommon for the original spindly springs to fall out or snap off.

The length of tape inside each cartridge is said to have changed from time to time, although we have not been able to confirm this. In theory you can compare the length of tape in several cartridges by formatting them all in the same drive. The more sectors you get, the longer the tape – but this assumes that all tapes run at the same speed, and in practice that does not seem to be true.

Drive motor speeds vary widely, so it's pointless comparing capacities between different drives unless you've matched their speeds. The method is explained below – but don't try it if you're ham-fisted.

Souped-up microdrives

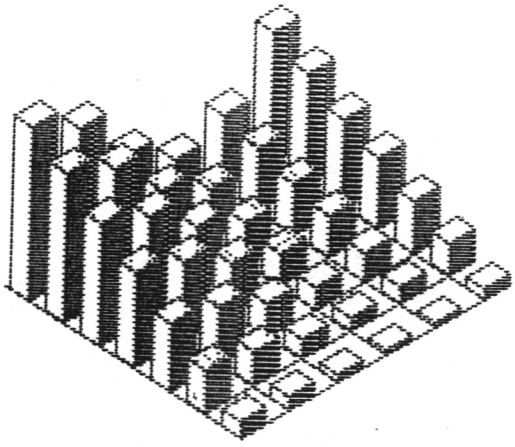
You can adjust the speed of a microdrive just like a cassette recorder. Dismantle the QL and tip the drive up after undoing the single screw under the drive and two screws on the top of the drive, at the bottom left and near the top right corner. Do not loosen the two screws nearest the rubber drive pulley.

Adjust the speed by pushing a sharp, flat-bladed screwdriver – no more than 2mm wide, at least 10mm long – through the rubber seal under the metal-cased drive motor. You should find a regulator screw; half a turn anti-clockwise is enough to change the speed from that which gives 200 sectors on a typical cartridge, to 230.

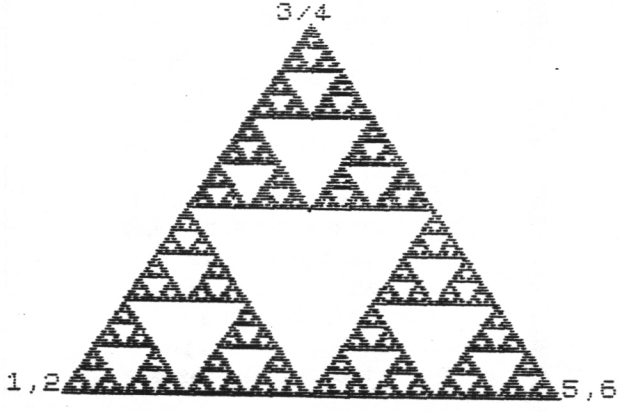
If the QL says 'format failed' on a previously-tested tape, the motor speed is probably too high, so that less than 200 sectors were found. It makes sense to set both your drives to the same speed – a formatted capacity of 216-220 sectors should ensure reasonable compatibility with old and commercial copies.

We haven't tried this on Spectrum or ICL One Per Desk drives, but the same tweak should work. The mechanisms are virtually identical, apart from the rubber roller that moves the tape, which will do its own thing regardless of the tape speed. We'd be interested to hear from readers who have adjusted their drives, but we advise you to leave well alone unless you're sure you can put things back the way you found them if you get into trouble.

This is not an exercise for the faint-hearted – remember that the



SCIENCE OF CHAOS




```
 100 REM 3 axis chart with solid
 bars
 110 REM z=(4+2*COS (x/20))*(y/1
0+1)
 115 INK 6: PAPER 1: BORDER 2: C
LS
 120 LET cx=128: LET cy=16
 130 LET dx1=10: LET dy1=5
 140 LET dx2=8: LET dy2=4
 150 REM Draw x,y grid
 160 GO SUB 400
 165 REM Draw chart
 170 FOR x=100 TO 0 STEP -20
 180 FOR y=90 TO 0 STEP -15
 190 LET z=INT ((4+2*COS (x/20))
*(y/10+1))
 195 REM Draw bar
 200 GO SUB 500
 210 NEXT y
 220 NEXT x
 230 STOP
 390 REM x,y grid subroutine
 400 FOR x=0 TO 100 STEP 20
 410 PLOT cx+x,cy+x/2
 420 DRAW -100,50
 430 NEXT x
 440 FOR y=0 TO 90 STEP 15
 450 PLOT cx-y,cy+y/2
 460 DRAW 110,55
 470 NEXT y
 480 RETURN
 500 REM Bar drawing subroutine
 505 REM Draw face of bar
 510 FOR n=0 TO z-1
 520 PLOT cx+x-y,cy+x/2+y/2+n
 530 DRAW dx1,dy1
 540 NEXT n
 545 REM Erase side of bar
 550 INVERSE 1
 560 FOR n=0 TO z-1
 570 PLOT cx+x-y,cy+x/2+y/2+n
 580 DRAW -dx2,dy2
 590 NEXT n
 600 INVERSE 0
 605 REM Draw side of bar
 610 PLOT cx+x-y,cy+x/2+y/2
 620 DRAW -dx2,dy2
 630 DRAW 0,z
 640 DRAW dx2,-dy2
 650 DRAW 0,-z
 655 REM Erase top of bar
 660 INVERSE 1
 670 FOR n=0 TO dx2-1
 690 PLOT cx+x-y-n,cy+z+(x+y+n)/
2
 700 DRAW dx1,dy1
 710 NEXT n
 720 INVERSE 0
 725 REM Draw top of bar
 730 PLOT cx+x-y,cy+x/2+y/2+z
 740 DRAW dx1,dy1
 750 DRAW -dx2,dy2
 760 DRAW -dx1,-dy1
 770 DRAW dx2,-dy2
 780 RETURN
 998 SAVE "3AXIS" LINE 1: STOP
```

higher the capacity, the slower the access time and the greater the density of recorded data. Microdrives are quite tolerant of speed changes when reading, but there's no point adjusting the speed of your drives if you then find it difficult to read tapes formatted at the old speed. Don't say you weren't warned!

BLACK SCREEN/WHITE LETTERS ON YOUR TS1000/ZX81
BY STEVE BERG

SOME TIME AGO DENNING LANGSTON CAME TO SEVERAL OF OUR USER GROUP MEETINGS HERE IN JACKSONVILLE. HE WAS A TS1000 DIEHARD (I GUESS HE STILL IS) AND WAS QUITE FAMILIAR WITH MACHINE CODE PROGRAMING ON THE ZX81/TS1000.
AT ONE OF THOSE MEETINGS HE HANDED ME THIS NEAT LITTLE PROGRAM THAT GIVES YOU A BLACK SCREEN WITH WHITE LETTERS. DEPENDING ON HOW YOU SET IT UP, IT COULD BE CALLED AS A SUBROUTINE OR JUST BUILT INTO YOUR PROGRAMS TO ALWAYS GIVE YOU A BLACK SCREEN.
A REM STATEMENT 20 CHARACTERS LONG WOULD HOLD THIS NICELY.
AFTER YOU GET THIS LOADED IN THE MANNER OF YOUR CHOICE,A RAND USER 16514 SHOULD DO THE TRICK. THANKS DENNING WHERE EVER YOU ARE.

HERE ARE THE 20 POKES :

ADDRESS:	:DECIMAL NUMBER
16514	6
16515	24
16516	42
16517	12
16518	64
16519	35
16520	126
16521	254
16522	118
16523	40
16524	5
16525	238
16526	128
16527	119
16528	24
16529	245
16530	5
16531	32
16532	242
16533	201

reprinted from Winter Issue of The Sinc Times, the N/L of the NE Florida T/S Users Group.

The Top 10 Companies in the Canadian Computer Industry

Rank	Company Name	Ownership	Total Revenues 1988	EDP Revenues 1988	EDP Revenues 1987
1	IBM Canada	U.S.	3693.0	3500.9	2945.0
2	DEC	U.S.	964.0	964.0	772.0
3	Unisys Canada	U.S.	780.0	531.1	505.0
4	SHL Systemhouse	Can.	509.3	509.3	438.7
5	NCR Canada	U.S.	278.7	278.7	245.0
6	Apple Canada	U.S.	277.0	277.0	177.5
7	Control Data Canada	U.S.	251.0	251.0	255.7
8	Hewlett-Packard	U.S.	364.0	221.3	193.8
9	Crowntek Bus. Ctrs.	Can.	212.0	212.0	139.0
10	STM Systems	Can.	210.0	210.0	167.9

Source: Evans Research Corp.

This development in Laptops should scare the pants off the Z88 dealers.

Lightweight laptops make hefty boasts

BY JAMES DALY
and RICHARD PASTORE
CW STAFF

SUNNYVALE, Calif. — The incredible shrinking computer reached a new level of diminutiveness last week with the debut of two MS-DOS portable computers, each weighing in at about one pound and promising extended operating time powered by standard AA-size batteries.

Atari Corp. and start-up Poqet Computer Corp. both laid claim to the featherweight title by introducing handheld computers that are roughly the size of a videocassette and use less power than a twinkling Christmas-tree light.

Poqet chimed in at the high end of the new market with a $1,995 system running MS-DOS 3.3. Lotus Development Corp., Wordperfect Corp. and other heavyweight software developers have pledged to make their leading applications available on read-only memory solid-state devices the size of a credit card.

The company said deliveries of the Poqet PC will begin in the fourth quarter and conceded that it has built only 80 of the

devices so far.

Atari wrapped itself in the low-price mantle of $399 for a 128K-byte random-access memory base model expandable to 640K bytes; immediate shipments have begun, the firm said.

Although there are few such machines available now, "You're going to see a lot more," predicted Kimball Brown, an analyst at Prudential-Bache Securities, Inc. in New York. "There is a really good market for these machines." Users are not satisfied with just data collectors or units capable only of manipulating files downloaded from full-function machines, Brown said.

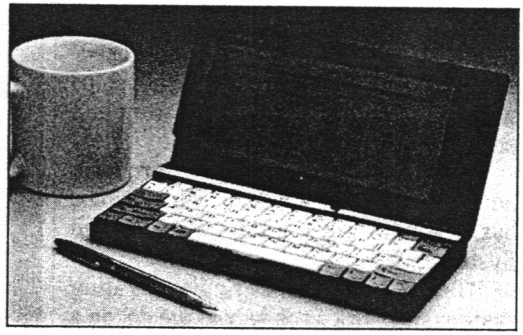
The Poqet uses a mere 50 milliwatts of power. The secret is that the machine has no moving parts. Rotating magnetic drives have been replaced by the solid-state integrated circuit memory cards. Although the power from two batteries shuts off between keystrokes — providing an operational life of up to 100 hours — the portable offers an access time of 100 nsec. At the heart of the machine is a 7-MHz Intel Corp. 80C88 chip.

"It sets a new standard for IBM-compatible computing. There's nothing quite like it on the market," said Bill Lempesis, an analyst at San Jose, Calif-based Dataquest, Inc. Lempesis said the only thing that may inhibit early sales of the Poqet PC is its relatively high price. Entry-level laptops can be had for as little as $600.

Both companies offer standard QWERTY keyboards; Poqet's system provides 77 keys, and Atari's offers 63.

Atari's Portfolio, which also powers off between keystrokes, is powered by three AA-size batteries that have a continuous-use life of 48 hours, the company said.

The Atari machine runs an operating system "adapted" from DOS 2.11 and uses a 4.9-MHz 80C88 microprocessor. Its screen only provides a 40-column, eight-line LCD, but its window function enables users to access any portion of a virtual 80-column, 25-line display. Poqet, on the other hand, trotted out an 80-character by 25-line display with resolution of 640 by 200 pixels, compared with Atari's 240- by 64-pixel resolution.



Poqet's secret *is no moving parts*

Both companies said their systems can be connected to desktop PCs for file transfer and bundled in various applications in read-only memory. Poqet also introduced a portable 1.44M-byte floppy disk drive powered by four AA batteries that the company said will operate for 25 hours at a 20% utilization rate. The Poqet PC includes 512K bytes of RAM, and the company said it plans to pump up current 512K-byte RAM storage cards with 2M-byte cards next year; Atari said it will provide optional storage on cards offering 32K, 64K or 128K bytes of memory.

Although Poqet has not built many systems to date, it has big plans. Marketing director Gerry Purdy said the 19-month-old company hopes to sell 300,000 machines next year.

Poqet's odds of success are increased by the financial backing of Fujitsu Ltd., which owns 38% of the company. Additionally, Fujitsu is working on a Japanese-language version of the product and can ensure a steady component supply in the event of a RAM chip shortage, Poqet President Stan Prodromou said.

Early evaluators seemed ready for the Poqet PC. One potential customer is Amdahl Corp. — in which Poqet backer Fujitsu has a 49% share — which is considering arming its national sales force with the portable. "We have laptops now, but they're often so cumbersome that they are frequently left behind," said Linda Fadden, manager of marketing systems. "We're looking for true portability, and Poqet may have something here."

reprinted from... SMUG Bytes November 1988

NET ON THE QL

By Dick Cultice

When I was asked to do an article on networking the QL, little was known about the subject in our club. So one Sunday afternoon a few members got together and tried it, but with little success. I should say none at all. Many crashes and unfriendly diagnostics were seen that afternoon. So that you do not have to go through the same thing, here are a few tips.

Getting started. Make up cables using speaker wire and miniature phone plugs. 3 would be enough. One 6', one 10' and one 20'. Also Toolkit II is required. Only one of any device type is needed as any QL can now use anyother QL's device.

Set up your QL, insure everything is operating OK and follow these instructions. Using one of those new cables, or the one comming with the QL, connect your QL to another one via the networking jack located on the right rear. There are two jacks and either is ok. Here we made our mistake. We connected the second cable, back to the first to complete the loop. This disconnected the pull down resistors in the circuit. Use only one cable between each machine, with the end machines having one empty jack. This gave a resistance about 160 ohms across the cables.

Count off. - Every QL must have unique net number. QL's with #'s from 1 to 8 can be used as FILE SERVERS. If a QL is to control a device it must be a FILE SERVER.

Toolkit II must be on before using the following commands.

OK? Gere is your first command:
NET station # <ENTER>
Station number is the unique net number asigned to the QL.

The next command is to be done only if you want the QL to be used as a FILE SERVER. The command is:
FSERVER <ENTER>

This command is only used after the NET command. Any station may use any device connected to a FILE SERVER. This includes disk drives, micro drives, ram discs, printers, monitors, ete. Stations that are servers may access other servers in the net.

Here are a few commands that can be used to access a server. NET 2 is a server with a disk drive. Net 3 is a server with a printer.

LOAD n2_flp1_filename - This will load a basic program from NET 2 disk drive 1 to the station the command came from.

WCOPY mdv1_ to n2_flp2_ - This will copy all files from micro drive 1 of the station to disk drive 2 of NET 2.

SAVE n2_flp1_myprog - Save the program from the station requesting to NET 2.

COPY myprog to n3_prt - Print the program in the requesting station using the printer in NET 3. I have not tried this but it should work.

You will be able to catch on to the form using these commands. Specifying a double device such as n2_ and (prt, scr or flp) will usually work. There are times when a comma (,) may be used instead of an underscore (_). Try a few to get the feel of the syntax of each statement.

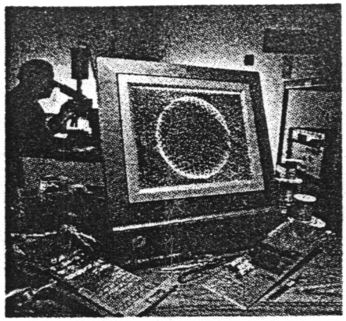
Most of the commands are given on page 34 of the "concepts" section of the QL users manual. There are more commands that work in Toolkit II. Commands working in background such as the print spooler can be used. When these commands are used. the server can be used for other processing.

NET is easy to use and can be fun. Share with another station.

Flat color display here

YORKTOWN HEIGHTS, N.Y. – IBM engineers and scientists are working on a prototype color flat panel computer display that is larger and clearer than any demonstrated so far.

With a screen density of over 1.5 million color dots, the experimental 14-inch diagonal IBM panel has greater resolution than most current color computer displays, IBM scientists say. Images can change on the screen fast enough for animation, and the backlit screen is readable in strong light.



IBM's experimental color flat panel computer display.

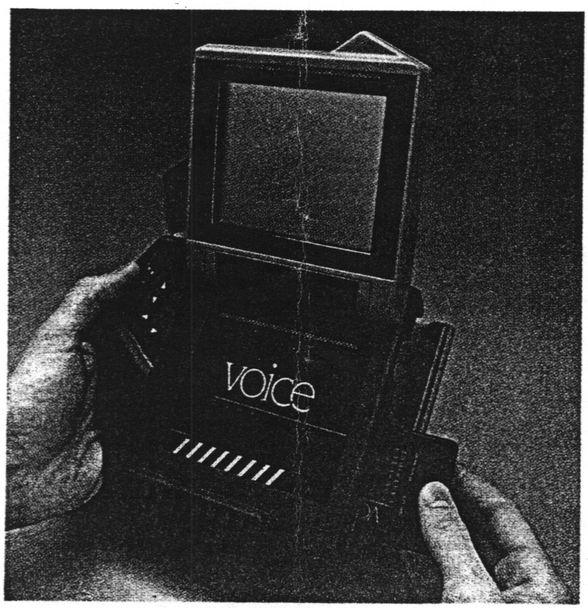
The 1.5-inch thick panel can display up to 16 colors. Images have high contrast (contrast ratio between high and low of better than 20 to 1) and the screen remains visible and legible even from acute angles – an important consideration for laptop/portable.

The project is a joint effort between IBM in Japan and Toshiba Corp., and the IBM Research Division. The screen is actually controlled by an array of more than 1.5 million transistors.

****

REDMOND, Wash. – **Advanced Products & Technologies** has introduced the *Voice Explorer*, a computer that supports voice recognition and language processing.

This hand-held unit can recognize thousands of pre-programmed spoken phrases and sentences; it can also output known phrases in synthesized voice. The device can be used as a standalone computer for such applications as a portable language translator (with special software). Or it can be used to activate and store data in a remote computer by voice rather than keyboard.



Advanced Technologies' *Voice Explorer*

The Voice Explorer can address up to four megabytes of memory, and the company says it has more eight- and 16-bit processors than an IBM PC-class machine. It has its own operating system, specially designed software and custom processors. The unit comes with AC adapter and rechargeable battery. It features a liquid crystal display (LCD), screen resolution of 160 x 128 pixel and RS232 communications. The unit has a suggested list price of $3,000 (U.S.).

```
   0>REM SECRET AGENT PROGRAM MA
KES CODING AND DECODING CHILDSPL
AY,PROGRAM BY BILL HARMER,APR.19
85.ALL RIGHTS RESERVED
   1 REM
SECRET AGENT IS A PROGRAM FOR
THE SINCLAIR 2068 WHICH IS
DESIGNED TO MAKE CODING AND DE-
CODING CHILDSPLAY. ORIGINAL PRO-
GRAM BY BILL HARMER CONVERTED TO
THE 2068 BY DAVID SOLLY, OTTAWA,
ONTARIO, 1985.
   2 REM SECRET AGENT COPYRIGHT
   1985 BY BILL HARMER,OTTAWA-
   NON-COMMERCIAL NON-PROFIT USE
   AND THE MAKING OF ONE PERSONA
L  COPY ALLOWED BY TIMEX-SINCLAI
R  USER GROUP MEMBERS
   5 REM REVISED TS 2068
     VERSION 2.
  11 REM SECRET AGENT 8
     (FINISHED)
  30 CLS : POKE 23658,8
  50 DIM X(100)
  60 PRINT AT 10,0;"*          SE
CRET AGENT          *"
  65 PRINT AT 9,0;"*
                    *"
  67 PRINT AT 11,0;"*
                    *"
  70 PRINT AT 8,0;"*
                    *"
  72 PRINT AT 12,0;"*
                    *"
  75 PRINT AT 7,0;"**************
**********************"
  77 PRINT AT 13,0;"**************
**********************"
  90 PRINT ; FLASH 1;AT 21,0;"PR
ESS  ENTER  KEY TO GO ON"
  95 INPUT A$
  96 CLS
  97 IF A$="SESAME" THEN GO TO 9
000
 100 PRINT "SECRET AGENT IS A PR
OGRAM        DESIGNED TO ENCODE A
ND DECODE    SECRET MESSAGES"
 101 PRINT
 102 PRINT "A MESSAGE IS ENTERED
 AND THE     COMPUTER WILL CONVER
T IT TO A    SEQUENCE OF UNINTELL
IGIBLE       NUMBERS. THE MESSAGE
 CAN BE      DECIPHERED BY ANOTHE
R PERSON     HAVING THE SAME PROG
RAM"
 103 PRINT
 104 PRINT "ONE MUST KNOW HOWEVE
R WHICH OF   THE FOUR CODING OPTI
ONS HAVE     BEEN USED"
 105 PRINT
 106 PRINT "VARYING THE CODING O
PTION MAKES THE CODE MORE SECURE
"
 110 PRINT ; FLASH 1;AT 21,0;"PR
ESS ENTER TO GO ON"
 112 INPUT A$
 114 CLS
 115 PRINT ; FLASH 1;"ENTER"; FL
ASH 0;"  CODE  OR  DECODE  DEPEN
D-ING ON WHETHER YOU WISH TO COD
E A NEW MESSAGE OR DECODE A CODE
D MESSAGE"
 120 INPUT M$
 130 CLS
 140 PRINT ; FLASH 1;"ENTER"; FL
ASH 0;" WHICH CODE YOU  ARE USIN
G (1, 2, 3, OR 4)"
 150 INPUT W
 155 PRINT
 160 IF W<>1 AND W<>2 AND W<>3 A
ND W<>4 THEN PRINT AT 10,0;"ENTE
R ONLY ONE OF THE NUMBERS 1,2,3
OR 4, TRY AGAIN"
 170 IF W<>1 AND W<>2 AND W<>3 A
ND W<>4 THEN GO TO 150
 180 LET I=W
 190 IF W=2 THEN LET I=5
 200 IF W=4 THEN LET I=7
 210 REM "I" IS EXTRA INCREMENT
OF SUBSTITUTION,HERE SET TO 1,3,
5 OR 7 (BY CODE 1,3,2,4)
 220 CLS
 300 IF M$="CODE" OR M$="C" THEN
 GO TO 1000
 310 IF M$<>"CODE" AND M$<>"DECO
DE" AND M$<>"C" AND M$<>"D" THEN
 GO TO 115
 320 IF M$="D" OR M$="DECODE" TH
EN GO TO 2000
 330 GO TO 115
 950 PRINT : PRINT "THIS PROGRAM
 USES ";38912- FREE ;"BYTES"
 990 STOP
1000 REM ENCODING ROUTINE
1010 PRINT "PROGRAM TO CODE A NE
W MESSAGE"
1020 PRINT "USING CODE NUMBER ";
W
1030 PRINT
1040 PRINT "ENTER YOUR MESSAGE N
OW (UP TO   100 CHARACTERS=APPRO
X. 20 WORDS)"
1045 PRINT
1050 PRINT "IF YOUR MESSAGE IS L
ONGER BREAK IT UP INTO SMALLER M
ESSAGES AND CODE THEM SEPARATELY
"
1055 PRINT
1060 PRINT ; FLASH 1;"ENTER MESS
AGE NOW"
1070 INPUT R$
1080 CLS : PRINT ; FLASH 1;"WAIT
"
1085 PRINT : PRINT : PRINT
1100 LET F$=""
1110 REM IN OTHER COMPUTERS LINE
 1210 WOULD BE- U$=MID$(R$,N,1)
1200 FOR N=1 TO (LEN R$)
1210 LET U$=R$(N TO N)
1220 LET Y=(CODE (U$))
1225 IF Y<33 OR Y>90 THEN GO TO
1300
1226 REM Y<33 OR Y>90 WOULD BE U
SED FOR LINE 1225 FOR ASCII
1230 LET Y=Y+7+I
1232 REM ZX-81 VALUES 63 & 53
          IN LINE 1240
1240 IF Y>90 THEN LET Y=Y-58
1245 REM IF Y>90 THEN LET Y=Y-58
 WOULD BE USED FOR LINE 1240 FOR
ASCII
1250 LET T$=STR$ Y
1270 LET F$=F$+T$+","
1300 NEXT N
1310
1340 CLS : PRINT "MESSAGE IS:",,
F$
1400 PRINT AT 20,0;"PRESS ENTER
TO CODE AGAIN OR     ENTER  B  TO
 GO BACK TO START"
1410 INPUT A$
1420 CLS
1440 IF A$="B" OR A$="BEGIN" THE
N GO TO 100
1460 GO TO 1000
2000 REM DECODING ROUTINE
2010 PRINT "PROGRAM TO DECODE A
NEW MESSAGE"
```

```
2020 PRINT "USING CODE NUMBER ";
U
2030 PRINT
2040 PRINT "ENTER THE CODED TEXT
 COMPLETE   WITH COMMAS BETWEEN
THE NUMBERS"
2045 PRINT
2050 PRINT "UP TO 100 NUMBERS AR
E ALLOWED INTHE TEXT";
2055 PRINT "(NO SPACES ARE PLACE
D IN THE DECODED TEXT)"
2060 PRINT
2065 PRINT ; FLASH 1;"ENTER MESS
AGE NOW"
2070 INPUT P$
2080 CLS : PRINT ; FLASH 1;"WAIT
"
2085 PRINT : PRINT : PRINT
2090 LET G$=""
2100 REM IN OTHER COMPUTERS FOR
LINE 2210 SAY-U$=MID$(P$,N,1) AN
D 2215 V$=MID$(P$,N+1,1)
2200 FOR N=1 TO (LEN P$) STEP 3
2210 LET U$=P$(N TO N)
2215 LET V$=P$(N+1 TO N+1)
2217 LET M=((N-1)/3)+1
2220 LET X(M)=VAL (U$+V$)
2230 IF X(1)=0 THEN LET P$=F$
2235 IF X(1)=0 THEN GO TO 2090
2237 LET X(M)=(X(M)-7)-I
2240 IF X(M)<=32 THEN LET X(M)=X
(M)+58
2250 REM IF X(M)<33 THEN LET X(M
)=X(M)+58 FOR ASCII IN LINE 2240
2260 LET G$=G$+CHR$ (X(M))
2290 NEXT N
2295
2300 REM "0000"(4 ZEROS) ENTERED
 WILL RESULT IN PREVIOUSLY CODED
 TEXT BEING ENTERED FOR DECODING
 AS A TEST
2320 CLS : PRINT "MESSAGE IS:",,
G$
2350 PRINT AT 20,0;"PRESS ENTER
TO DECODE AGAIN OR  ENTER  B  TO
 GO BACK TO START"
2360 INPUT A$
2365 CLS
2370 IF A$="B" OR A$="BEGIN" THE
N GO TO 100
2380 GO TO 2000
9000 CLS : CLEAR
9010 PRINT "[illegible]
"
9020 SAVE "Spy" LINE 30
9030 SAVE "Spy" LINE 30
9040 CLS : PRINT "Verification.
Rewind and play"
9050 VERIFY "": VERIFY ""
```

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AT&T'S KARMARKAR: PATENTING AN ALGORITHM

Perhaps the most radical attempt to stretch the definition of intellectual property is AT&T Co.'s patenting of an algorithm. The Karmarkar algorithm, developed at Bell Labs, can optimize solutions to a slew of complex problems, such as airline scheduling, distributing materiel in the armed forces, and mixing complex chemical combinations. Expressed in linear equations, these problems have thousands of variables and hundreds of thousands of constraints. Other algorithms can be used to attack them, but Karmarkar yields significantly better results.

Still, seeking a patent—which AT&T received from the U. S. Patent Office in May 1988—was a bold move. Mathematical formulas have traditionally been considered "facts of nature," not creative works, and therefore unpatentable, says Michael Shamos, a lawyer and adjunct professor at Carnegie Mellon University in Pittsburgh.

Clearly, AT&T made the move to hold on to a very valuable piece of property. "Computer programs implementing other linear programming algorithms sell for $1 million or more," says Shamos. But AT&T is likely to charge licensing fees "on a reasonable basis" for Karmarkar, says Pam Samuelson, a law professor at Emory University in Atlanta. The reason: "So that no one sues." Legal scholars believe a challenge to AT&T's patent would succeed. All three cases in which the U. S. Supreme Court has considered the patentability of algorithms have gone against the companies seeking patents, says Samuelson.

But such a move is unlikely. Fighting AT&T would cost millions of dollars, says Shamos, and companies will probably find it more prudent to simply license the algorithm. "The patent office is now issuing patents on anything," says Samuelson. "At some point, the patent office will issue enough algorithm patents that the law will have been changed without the cases being tried." *–J. S.*

German hackers prosecuted

Three years after alleged forays into government, defense contractor and university computers in the U.S. and other countries, West Germany has indicted three men on espionage charges. The men, two of whom are in custody, are charged with passing information to the KGB, the Soviet intelligence agency. Their activity was detected in 1986 by then-University of California at Berkeley computer researcher Clifford Stoll, who kept records of the break-ins over Internet and set a computer trap for the hackers.

CANADA

CRIMINAL CODE

R.S.C. 1985, c. C-46

Sec. 342.1. Unauthorized use of computer. — (1) Every one who, fraudulently and without color of right,

(*a*) obtains, directly or indirectly, any computer service,

(*b*) by means of an electromagnetic, acoustic, mechanical or other device, intercepts or causes to be intercepted, directly or indirectly, any function of a computer system, or

(*c*) uses or causes to be used, directly or indirectly, a computer system with intent to commit an offence under paragraph (*a*) or (*b*) or an offence under section 387 in relation to data or a computer system

is guilty of an indictable offence and is liable to imprisonment for a term not exceeding ten years, or is guilty of an offence punishable on summary conviction.

(2) In this section,

"computer program" means data representing instructions or statements that, when executed in a computer system, causes the computer system to perform a function;

"computer service" includes data processing and the storage or retrieval of data;

"computer system" means a device that, or a group of interconnected or related devices one or more or which,

(*a*) a contains computer programs or other data, and

(*b*) pursuant to computer programs,

(i) performs logic and control, and

(ii) may perform any other function;

"data" means representations of information or of concepts that are being prepared or have been prepared in a form suitable for use in a computer system;

"electromagnetic, acoustic, mechanical or other device" means any device or apparatus that is used or is capable of being used to intercept any function of a computer system, but does not include a hearing aid used to correct subnormal of the user to not better than normal hearing;

"function" includes logic, control, arithmetic deletion, storage and retrieval and communication or telecommunication to, from or within a computer system;

"intercept" includes listen to or record a function of a computer system, or acquire the substance meaning or purport thereof.

(1985, c. 19, s. 46.)

SecurePhone from Cylink now available

SUNNYVALE, Calif. – Cylink Corp. has introduced the SecurePhone voice encryption unit. The SecurePhone connects to any standard touchtone telephone and protects sensitive conversations over public telephone, microwave and satellite networks. It is available immediately.

The SecurePhone combines the latest signal processing and encryption techniques into one compact unit. It can operate full-duplex in both secure and clear modes, and is easy to use. The product is controlled by the telephone

connected to it, and it is small enough to fit easily under the telephone or in a briefcase for protecting calls placed from remote telephones.

When the SecurePhone is switched to the secure mode, a patented voice coding technique is used to compress the voice signal into a 2400 bps digital sequence.

The coded voice is then digitally encrypted using either the U.S. government certified data encryption standard or Cylink's proprietary encryption algorithm.

The SecurePhone uses a fully automatic, public key management system which eliminates the hassle of transporting and managing the keying material.

After encryption, the digital voice is sent via an internal modem which provides reliable communications even under high error rate conditions.

The single unit list price for the SecurePhone is $3,500 (U.S.). There is a reduced price for volume ordered.

Artificial intelligence puts *Voyager* on a smooth course

The *Voyager 2* spacecraft's rendezvous with Neptune, billions of miles away, produced more than pictures of the planet's rings. An artificial intelligence program designed to help those monitoring the flight operated as planned.

The program, called Spacecraft Health Automated Reasoning Prototype, or SHARP, is likely the largest such program in existence with 400,000 lines of code. It was built during the last three years by eliciting the knowledge of human monitors and crafting a set of rules to relate to hypotheses, according to Richard Doyle, supervisor of the lab's AI group. "The major part was getting knowledge out of the engineers' heads and into a form the computer can use," Doyle said.

SHARP was fired up about a month ago in parallel with the time-honored method of monitoring the spacecraft. The traditional way of checking the craft — making sure it operates as planned and diagnosing any problems — is done on six consoles with operators observing each monochrome screen as well as poring through thick, repetitive readouts of the condition of the spacecraft's equipment. What is not shown on the monitors must be filled in by the operator's knowledge.

Except for power outages, the SHARP program is running, according to Mark James, cognizant engineer working on the project for the Jet Propulsion Laboratory in Pasadena, Calif. "It's an order of magnitude of improvement over what they've got," James said.

While the human monitors are not yet relying on SHARP, the program has found two problems. When SHARP was first employed, it found a receiver that was not locking in on data. "It detected it but didn't find a solution," James said. He said that SHARP also found a receiver noise problem that was undetected by the human monitors.

AP/WIDE WORLD

Neptune and some *of its features as seen by* Voyager 2

High-tech weapons, low-tech GIs

BY JAMES DALY
CW STAFF

On a drowsy spring evening two years ago, a sailor manning the control room deep within the bowels of the frigate *USS Stark* was monitoring the screen of a sophisticated radar system that was designed to pinpoint and alert the operator to nearby objects in the water and airspace off Bahrain.

While the warm turquoise waters of the Persian Gulf slapped lazily against the ship, an Exocet missile fired from an Iraqi jet rocketed neatly above the waves and straight at the vessel. The missile slipped swiftly through the radar's defensive net, carved a jagged hole in the side of the *Stark* and brought the lives of 37 sailors to a fiery and violent end.

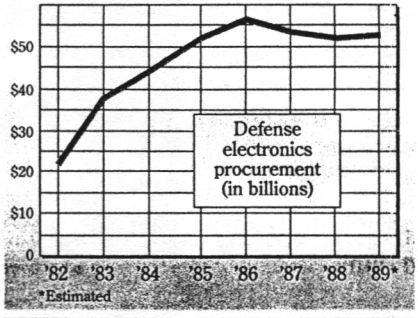
The lingering distaste from the debacle on-board the $300 million warship, coupled with the more recent congressional fight over the enormously expensive Stealth B-2 bomber, highlights a dark side of the Pentagon's increasing integration of high-tech weapons into its war machine.

Despite the investment of huge amounts of training time, effort and money, some critics argue that today's supersophisticated armaments have become so complicated that they have outgrown the ability of sailors and soldiers to use them effectively.

"We're becoming overly dependent on computers," said Gen. Larry Dilda, deputy chief of staff at the Air Force Communications Command at Offut Air Force Base in Bellevue, Neb.

In the chips

Despite recent moderation because of budgetary pressures, Defense Department spending on electronics has made a big jump since the start of this decade



SOURCE: ELECTRONICS INDUSTRY ASSOCIATION CW CHART: FRANK C. O'CONNELL

"When the computer goes down on the B-1 [bomber], you can't tell what's wrong with it. And if the computer on the B-2 goes down, you don't crank engines, you don't taxi, you don't fly. I'm not sure that's too smart," Dilda said.

While West Pointers are not yet strutting to a voice-synthesizing computer, most observers agree that computer-based technology will be as important to the soldier of the 1990s as a bayonet was to the Marine of 1942. Computer technology already plays a crucial role in weapons ranging from M-1 tanks to Navy diving suits. And the Stealth bomber, at more than $500 million per plane, will be one of the most sophisticated computer-based weapons ever produced.

Critics say many of these budget-draining armaments are simply not living up to their hype. "Much of the technology is inherently unreliable because it hasn't gone through extensive testing, it's often difficult to repair, and when it breaks, it tends to have rather catastrophic effects," said Gary Chapman, executive director at the Palo Alto, Calif.-based Computer Professionals for Social Responsibility.

Reports ranging from a B-1 bomber crashing when it hit a pelican to the embarrassing Divad project — a computer-operated anti-aircraft gun that once identified a rotating latrine fan as the closest threatening target — have initiated brass-filled investigative hearings. Additionally, Air Force Col. John Boyd has repeatedly challenged the "gold plating" of weapons with excessively costly gadgetry that constantly breaks down.

The trouble is, the military culture may already be too infatuated with leading-edge devices to ever turn back. While the human mind has never been at a loss for improvements in the way people kill one another — machine guns, nerve gas, napalm and nuclear weapons all stand as testaments to thinking as inventive as it is diabolic — the Pentagon's commitment to computer technologies is too deep-seated to be changed easily.

During World War II, analog computers helped anti-aircraft guns track high-speed bombers and V-1 rockets aimed at the UK. In Vietnam, computers became essential to the U.S. military's method of waging war by feeding endless streams of data from intelligence reports into huge banks of computers in Saigon and Nha Trang.

Those trends do not appear to be diminishing. For most of this decade, the armed forces benefited from the greatest peacetime buildup in the history of the U.S. At its peak, the money spent for military research hit $40 billion annually, or nearly 65% of all federal money targeted for research and development.

Much of that cash has gone for high-tech weapons. The Center for Defense Information in Washington, D.C., reports that the Pentagon's electronics procurements have more than tripled since the beginning of the decade and now account for more than 40% of the military's production costs.

Soldiers said that when the computer-based systems are up and working properly, they are a welcome addition. Vin Collins, a 10-year veteran of the Army Reserve who serves as a tank commander at Fort Devens in Massachusetts, said the M60 tank's computer-assisted fire control unit is one of the machine's best features.

"Automotively, the tank is a dog," Collins said. "But the firing unit is practically idiotproof, and it makes our job a heck of a lot easier."

Collins noted, however, that problems sometimes occur when less-experienced soldiers take the word of on-board computers as gospel, sometimes even relying on computer-generated trajectory and firing-distance information that is clearly contradictory to what the soldier can see from the tank's viewing ports.

Sophisticated technologies have also been assigned the job of safeguarding weapons. Stunned by incidents such as finding Stinger anti-aircraft missiles in Iranian hands, the Department of Defense is reportedly investigating a method that would require a personal identification number to fire the missile, thus preventing its use if it were stolen or fell into enemy hands. In addition to making the weapon inoperable, a satellite could also track a code transmitted from an installed chip and disable the unit.

The Department of Defense has also integrated computer-based strategic planning into the grander defensive picture, but they have often met bitter resistance on that front. Last year, the Congressional Office of Technology Assessment said the large fault-tolerant battle management software package needed for the proposed Strategic Defense Initiative was so complex that the chances of it experiencing a "catastrophic failure" during its first real war test were great [CW, June 13, 1988].

The agency countered such distrust with a more decentralized strategy called "brilliant pebbles," in which most of the computer processing would occur on-board thousands of space satellites about the size and shape of an overweight first-grader: three feet tall and 100 pounds.

The weakest link

However, some critics say the military is overlooking one important point. "The weapons might be the most advanced thing going, but the designers forget the weakest link in the chain — the human operator," said Steve Kosiak, an analyst at the Center for Defense Information. "To the Pentagon, high technology often translates into complicated technology."

Some Army officers claim it can take a soldier 20 hours per week just to stay familiar with the scores of instructions needed to point computer-guided artillery pieces.

Similarly, weapons specialists claim it takes more than two years to learn how to operate RCA Corp.'s Aegis system. The complex Aegis, a network of radar antennas, computers and missile-firing devices designed to protect large ships, blasted an Iranian airbus out of the sky in July 1988 [CW, July 11, 1988] after the crew mistakenly identified the 117-foot civilian jet as a 62-foot F-14 jet fighter employed by the Iranian air force.

Although the crew of the *USS Vincennes* reportedly claimed that the Aegis tracking component showed the plane descending in its direction — in contradiction to other sightings that showed it climbing — the Pentagon subsequently blamed the disaster on human operator error.

Military officials contend that those problems are being addressed aggressively. At the U.S. Military Academy at West Point, heavy emphasis is put on becoming technologically nimble. But instruction goes beyond rote memorization. Chief of Academic Computing Maj. Robert J. Schuett said young cadets are taught that they should treat the computer as a tool, not as an officer-in-command.

"One of our most critical lessons is teaching our cadets when to rely on a computer's information and when to analyze the situation on your own," Schuett said. "We don't want to teach the cadets to be intimidated by it, because if they start using it as a crutch, we're in trouble."

However, a soldier's reliance or nonreliance may be a moot point when faced with the task of simply operating technically sophisticated armament. The Stinger anti-aircraft missile is often cited as one of the most confusing weapons around. To operate the weapon, the gunner must complete 18 steps, some of which are complex, and make rapid decisions about the type of aircraft being fired on. All this must occur in the confusion and heat of battle.

Other weapons may simply be too clever for their own good. In theory, a surface-to-air missile is incredibly accurate because it can pick up on subtle clues to find and destroy the enemy. But if these same clues are changed, it can be alarmingly easy to disable. A 79-cent roll of aluminum foil, for example, when cut into small ribbons and released from an aircraft or ship, may be enough to befuddle the radar tracking system on a missile often costing upwards of $50,000.

Because the list of the Pentagon's high-tech goof-ups is long, the Defense Department has begun to seriously investigate the use of artificial intelligence. Observers noted that if these efforts pick up, developers are sure to follow closely behind. As Gary Martins, former manager of advanced software research and development at Rand Corp., put it, "When the Department of Defense takes a big bag of money and paints 'AI' on it, this instantly creates a lot of believers in artificial intelligence."

Unfortunately, this does not create a working technology. Critics contend that war is kaleidoscopic, filled with constantly changing, unexpected and confusing situations that some feel cannot be completely satisfied by mathematical formulas or set rules.

Nevertheless, the debate over how much technology is required for the average fighting soldier to do his job effectively is likely to go on as long as war does. "This is one issue that is not going to go away," Schuett added. "Our job right now is to equip the soldier rather than man the equipment. If we succeed there, half the battle is already won."

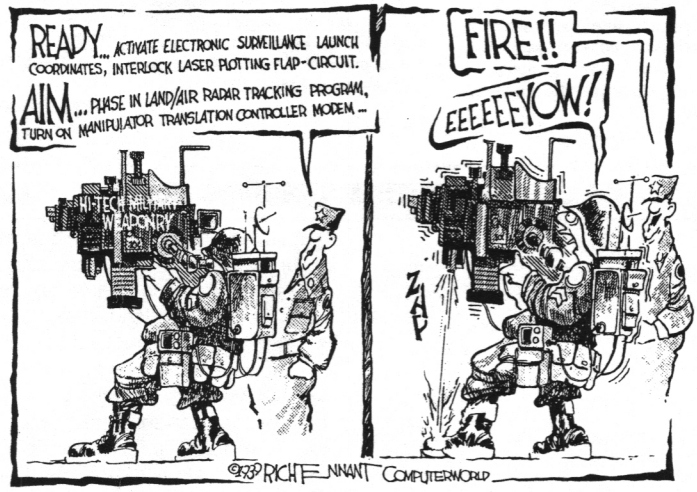
Zeroing in on fiber

One important target for Defense Department dollars is communications. Whether it is a five-star general calling down orders or an airborne missile receiving them, the military is relying heavily on fiber optics to get the message across.

The military has found a lot to like about fiber optics. The signals are difficult to tap because they do not radiate and are not susceptible to data corruption from high-noise environments such as the operation of nearby heavy electrical machinery. In the early 1990s, analysts predict, fiber optics will be found everywhere, from the sea floor — where they will be used to string together hydrophones that listen for submarines — to the stratosphere, where they will hang from surveillance balloons.

Portable local-area networks have also crossed the Pentagon's sightlines. The Second Marine Division in Fort Pickett, Va., for example, has used a portable 10net Communications, Inc. LAN for electronic mail and planning military strategies during week-long war games.

JAMES DALY



Computers help police fight crime

by Suzanne Wintrob
Computing Canada

TORONTO – Walking up and down the trade show aisles of the annual International Association of Chiefs of Police conference can be a real eyeopener.

Amidst the combat gear and Smith & Wesson displays, the shooting ranges and Uzi submachine guns, the United States Marines and the International Association of Women Police, are the latest in law enforcement software and hardware.

The 94th annual conference was held recently at the Metro Toronto Convention Centre, where 9,000 delegates from more than 60 countries got a chance to see the newest advances in police technology, ranging from heavy artillery to computer-aided dispatch systems and computerized composite sketching.

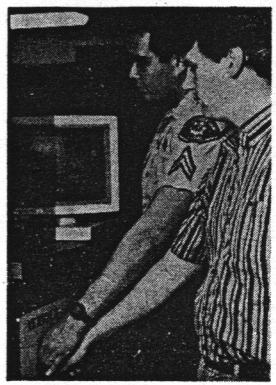
Among the 600 exhibitors at the show, the majority of whom were based in the United States, were several companies demonstrating systems that put color mug shots on a computer screen.

Compu-Color, a data imaging system from Iowa-based ASI Computer Systems Inc., eliminates the need for victims to search through pages and pages of mug shots for anyone who resembles their assailant.

Instead, the system allows an officer to input information supplied by the victim and narrow the search down to a short list of suspects within seconds. The search can be narrowed even further by looking at active or closed files or specific neighborhoods.

Once the data is collected, a color image of the potential suspect showing front and/or side views is displayed on the computer screen. The system even allows the victim to view a line-up of suspects on the screen. Hard copy can be retrieved from a color video printer.

Sales manager Michael Ott says Compu-Color, which had its debut at the conference, differs from similar systems displayed at the show because "we use laser disk and we run on the IBM PS/2."



The Fingermatrix remote access network.

The price of the package is $40,000 (U.S.) and comes with an IBM PS/2 with 13- or 14-inch color monitor, an optical laser disk, a color or black-and-white video printer and a video camera.

A similar system was displayed by Massachusetts-based International Optical Telecommunications Inc.

Engineer Glenn Elion says the system, called Video ID, is not just the only system designed by police detectives and district attorneys, but it is the only one in the world that has been used successfully from the initial stages in the police department to the final stages of a court appearance.

Video ID, which is in use in Boston's police department, costs $50,000 (U.S.). If networking, cost of the hardware alone is about $20,000.

Visatex Corp. of California was at the conference to display Compusketch, a computerized system that generates composite sketches of suspects.

Boasting an "in-your-own-words description", the system takes a victim's information and creates a sketch (as opposed to a color image) on the computer screen. A hard copy can be made on a printer.

The system, which requires no artistic ability to use, can produce almost endless variations of a face. For example, it can generate 85,000 types of eyes and 14,000 different types of noses.

Engineer Steve Williams says that the Santa Barbara, Calif. police department "swears by" Compusketch. He adds that one victim burst into tears when she saw a final sketch of her attacker based on her description.

Compusketch software costs $3,500 (U.S.) and is available for use on Apple and IBM computers.

At another booth, police forces were introduced to a method of taking fingerprints without inking and rolling fingers.

The Fingermatrix Veridex Z3000, created by Fingermatrix Inc. of North White Plains, N.Y., scans the ridges in fingers to create laser-generated fingerprint cards. Highly sensitive optical scanning equipment "reads" the finger and converts the image into digitized data.

The system has slots for three different finger sizes, leaving enough room in each slot for an officer to hold the suspect's finger in place if he or she resists. The system can do a nail-to-nail and tip-to-tip scan, making the process as complete as a rolled ink print without the risk of smudging.

The Santa Barbara police department is already using the system, which has a base price of $35,000 (U.S.). The FBI in Washington, D.C. is currently testing it.

Another new product, which is already in use in police departments in Massachusetts and South Carolina, is a video camera that mounts on a patrol car's windshield.

By wearing a wireless remote microphone that works as far away as 150 feet, the officer can make audio and video recordings of everything from routine traffic stops to roadside arrests.

Thomas Harris, marketing director of 1075 Inc. of Lake Mary, Fla., says that the $3,800 (U.S.) system, called the Observer, is the only one of its kind that uses VHS format. He adds that 8mm format "cannot take the wear and tear that a police car can take."

Harris says he is actively looking for a Canadian distributor.

HUGHES COMES UP WITH A 'LIGHTNING ROD' FOR SPACE

How do you counter the buildup of electrical charges on spacecraft? With a lightning rod, of course. But that brings up another question: how do you ground a lightning rod in space? The answer, from GMHE/Hughes Aircraft Co. scientists working at the Research Laboratories in Malibu, Calif., is to use a self-contained on-board generator to emit ions and electrons. They envelop the spacecraft in a neutralizing conductive plasma cloud that grounds the vehicle. Hughes calls the concept Spaceclamp because it effectively holds, or clamps, to near zero the spacecraft surface voltages that have the potential to zap computers and avionic packages. Hughes researchers have just delivered the system to the Air Force Geophysics Laboratory at Hanscom Air Force Base, Mass., after five years of development. □

Computer Languages

One might ask, "Why can't we just communicate with a computer in plain English and have that as our computer language?" Of course the earliest computers had neither the speed nor the memory capacity to analyse ordinary English much less come up with a response as more recent attempts at producing such a computer have shown. No, at the beginning, it was just good enough to be able to feed in a few formulas and get a decimal fraction answer so that scientific problems could be solved without longwinded and tedious machine language programming. And FORTRAN (FORmula TRANslation) invented by IBM's J. Backus in the mid-50's performed this function admirably and is still in use today by engineers and scientists. BASIC in fact drew its fundamental features from those of FORTRAN.

Later, business data processing using non-computer punched card equipment was computerized largely by IBM and another attempt at producing a plainer, easier language was made with COBOL's invention. COBOL was a business oriented but general purpose language. COBOL stands for COMmon Business Oriented Language. It is still used in government and business mainframe (large, standard computers like the IBM 360) computer departments.

Another batch of languages came from the universities as an attempt to make a perfect introductory language for computing science students. From this came BASIC (Beginners' All-purpose Symbolic Instruction Code) in the U.S. and Pascal (named after the philosopher Blaise Pascal and thus not all capitals in spelling) by the European Nicholas Wirth. Both languages have found practical uses outside the school environment which overshadowed their original educational purpose.

Attempts to make a language that produced faster programs resulted in C Language (designed in order to be used to write the operating system Unix). The somewhat cryptic designation C resulted because two previous attempts produced A Language and B Language (the latter sold in a version to run on the Sinclair QL interestingly enough). Prof. Wirth has also gone on to work on Modula now in its second reincarnation (Modula-2) and it is said to run with the speed of C Language but be much easier to understand and debug when seen in the form of a written program. It may out do his Pascal.

Attempts to write programs incorporating artificial intelligence have resulted in the language LISP (LISt Processing) in the U.S. and PROLOG in Europe, the latter being the more recent invention by about ten years.

After the U.S. Defence Department decided to standardise its computer programming so that its many computer systems could more easily be made compatible and a program written in one language for one CPU wouldn't need to be thrown out when another CPU using another language replaced it, the remedy was Ada. Named after a person, the friend and co-worker of an early mechanical computer designer Charles Babbage, Lady Ada Lovelace.

FORTH has come and gone with interest of its zealous proponents declining. PL/1 (Plain Language or Programming Language?) is used on some mainframes and is similar to BASIC but more complicated. APL described as the possible native language of Martian mathematicians because of the difficulty that ordinary mortals have in understanding it has been limited too by the need for special characters and thus often a special keyboard or overlay for an ordinary keyboard. It was promoted by the computer programming/consulting firm IP Sharp in the 1970's.

The modern trend has been to use special purpose languages or programs with a language-like programmability (depending on how you look at it these are two sides of the same coin or program). Examples of this are DBase III, Lotus 1-2-3 (a spreadsheet for financial calculation) and a number of other languages for statistics in the social sciences to specific fields of engineering design and technical work. Also database query languages some mimicing certain sentences in English can also be considered similar in nature.

NOT-SO-FAMOUS COMPUTERS

While one tends to think of computers in terms of IBM, DEC (Digital Equipment Corp.) and the personal computer makers from Apple to Zenith, there have always been a host of also-rans in the business, right from the start when the big computers were by IBM and the 'seven dwarfs'— Burroughs, Sperry, Univac, NCR, Honeywell etc. So in this article in the "Famous Computers" series let's take an overview of the not-so-famous models.

Perhaps one of the reasons for IBM's overwhelming success in the early days of computers was the fact that IBM merely computerized a well established non-computer punched card data business, well backed with manufacturing and financing facilities as well as an international sales force. This was based on the technology of the 80-column punched data card of Herman Hollerith of the U.S. Bureau of the Census, and goes back to the turn of the century. IBM took this business and governement data processing technology and enhanced it by having the processing done by computer.

IBM was not first on the computer scene. Computers in Germany, Britain and the U.S. used for war work preceded them and Univac was a very early computer originator in the U.S. But IBM expanded phenomenally and the other early firms merely held their own.

The first innovation to come after that was the minicomputer, intended to offer computer power to monitor scientific experiments and industrial processes as well as do technical calculations a field for which the earlier standard computers (soon to be called mainframes) were too expensive. In addition to the leaders in the industry —DEC, Hewlett Packard, Data General and Texas Instrument a number of small firms including Varian Associates (noted for the pre-WWII invention of the microwave Klystron transmittin tube) also marketed computers.

The next threat to IBM came with the plug compatible mainframes, IBM mainframe computer clones that were made possible when the IBM 370 operating system landed in the public domain in the 1970's. Amdahl founded by Gene Amdahl a former IBM employee, Prime, Control Data and other firms began marketing these clones to former IBM customers at reduced prices.

A still further proliferation and the biggest to date came with the microcomputer, using single chip silicon integrated circuit technology for most of the CPU. The MITS Altair, IMSAI, Osborne, Ohio Scientific, Cromenco, Northstar, Heathkit, Compucolor and KIM computers were ones that remain today as either memories or surplus/used market bargains. The S-100 bus and the 8008, later 8080, later Z-80 microprocessors and CP/M operating system were tried as early standards in this fast moving field but have slipped now.

Now the action is moving again from small computers to big ones, the supercomputers pioneered by Control Data, Cray and Cyber brand names became familiar and the latest development is the emergence of mini-supercomputer makers who offer nearly as good performance at reduced prices often by making up computers with many silicon chip microprocessors in parallel. (Don't confuse mini-supers with super-mini's like the VAX 11/780 either).

So it seems that with each development in technology, a market niche is created into which a host of start-up enterprises rush with fresh ideas, ever fresh engineering talent and the teasing prospect of becoming if not all millionaires, at least rapidly richer. And each new opening in the market brings a rash of new names to the computer business, some to stay a while and others to vanish or change beyond recognition as quickly as they arose.

So when you are talking to computer people or going over old history or technical literature, don't be surprised to find a Varian minicomputer in with the DEC equipment, a Burroughs in with the IBM era, or a Computer Automation PDC mentioned in the "Computer Technician's Handbook" (TAB books). They are all part of the history of computing's colourful past.

Skywave laptop-to-satellite link set to go

by John Eberlee

Special to Computing Canada

OTTAWA – A Kanata, Ont. communications firm has developed a portable device that lets users place telephone calls from anywhere in the world.

The device, called an L-band briefcase terminal, routes remote calls through mobile satellites to ground stations in about two minutes, according to Peter Rossiter, vice-president of engineering at Skywave Electronics Ltd.

The time is right for mobile communications, says Rossiter. International organizations have allocated the L-band frequencies – 1.5 to 1.6 GHz – for mobile satellites. The worldwide network INMARSAT (International Maritime Satellite Organization) has satellites in place. And MSAT, the North American system proposed by Telesat Mobile Inc. and the American Mobile Satellite Consortium, should be operating in a few years.

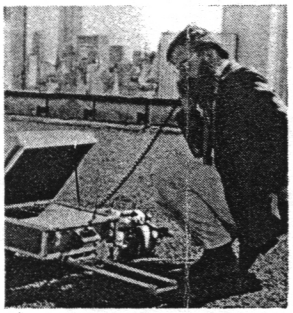
Skywave's invention consists of a laptop computer, telephone receiver, transmitter and modem plus flat-plate microstrip antennas that all fit in a large metal briefcase.

The modem uses digital signal processing techniques developed at the federal Department of Communications' Shirley's Bay Research Centre – near Ottawa – and licensed to Skywave.

To place a call, says Rossiter, "You pop up the briefcase lid, attach antennas and set the terminal on beacon mode."

Users then twist the briefcase to lock onto an overhead satellite. A high pitched tone heard in the receiver indicates maximum signal strength.

Rossiter says it takes just 30 to 40 seconds to set things up provided a clear line of sight exists between terminal and satellite. During testing last fall in New York, Skywave's engineering team had problems finding an area unobstructed by skyscrapers.



Portable device calls anywhere.

"We eventually chose the top of CBS headquarters and the front lawn of the United Nations building," Rossiter notes.

Calls are completed on the communications mode setting. Users enter telephone numbers from the keypad. Satellite ground stations then relay calls to their final destination.

Not all stations are equipped yet for Skywave's technology, says Rossiter. And some stations are still under construction – Teleglobe Canada's plans include a station on each coast to complement the Shirley's Bay facility.

Ground stations will eventually handle billing details, says Rossiter. "INMARSAT bills now on a per call per minute basis. Telesat will probably adopt a similar approach."

He says where calls originate should have no bearing on tariffs, at least technically. "A call from Moscow is essentially indistinguishable from a call from New York. The only thing that matters is connect time."

Skywave expects to mass produce its device by the mid 1990s. And it hopes to have commercial versions available earlier for certain users. This strategy involves a slight gamble, concedes Rossiter.

"The earlier we release our product, the more we risk adopting an approach that won't be standard," he says. International standards for modulation and satellite access techniques have yet to come.

"It's a question of balancing the advantages of getting there early or waiting while standards are defined and the competition turns fierce. Skywave, as a young company, obviously sees the wisdom of marketing early."

Rossiter believes the L-band terminal, like other communications innovations, has considerable market potential.

"Everybody wants to communicate on the move now," he says. "Having a phone on your desk is just not good enough – witness the rise in cellular radio, nationwide paging and cordless telephones."

Executives on vacation, journalists, diplomats, mining exploration camps, forest fire fighters and truckers represent ideal markets, he speculates.

"Truck drivers want to communicate to cargo owners in distant cities," he argues, "especially when mechanical problems like a freezer system malfunction occur."

Rossiter says commercial versions of the L-band terminal will combine portability with flexibility. The complete assembly, eventually costing $5,000 to $10,000, will weigh about 24 lbs and run on automotive or AC batteries. "And it will be rugged enough to survive the automotive environment. That means withstanding vibrations, shocks, battery level fluctuations and an 80 to 90 degrees Celsius temperature range."

Five-year-old Skywave Electronics received financial support from the Department of Communications and the Department of Regional Industrial Expansion.

REPAIRS

Dan Elliott will perform the following repair services:

1. The following items will be repaired for $5.00 each plus parts: TS1000/ZX81, 16K Rampak, any Memotech module.
2. The following items will be repaired for $10.00 each plus parts: TS1500, TS2040, TS2050, PC8300, ZX80, Z-SIO
3. The following items will be repaired for $15.00 each plus parts: TS2068, SPECTRUM, A&J Microdrive, Larken 2068 FDI, Cumana FDI, Larken 1000 FDI, CST FDI
4. The following items will be repaired for $25.00 each plus parts: Sinclair QL

For repairs or modifications/upgrades to add-on modules, printers, monitors, or other computerized equipment not listed above - write for a price quote. Service is also available for Commodore, Coleco, and TI computers.

Most repairs will be completed and returned in 4-6 weeks. Upgrades, modifications or problem cases may take longer. Notification of extended repair delays or excessive costs will be sent.

The minimun service charge will be $5.00 per unit serviced regardless of the circumstances.

For repairs, please use a seperate sheet of paper to describe in detail the problem you are encountering and whether or not the problem is intermittent. List any software or hardware that are associated with the problem. Also list any modifications that have been done to the equipment.

For upgrades, please enclose or specify the magazine article or other source of information for doing each upgrade.

CAREFULLY pack and ship the equipment via UPS or parcel post.

*** DO NOT SHIP THE POWER SUPPLY WITH THE EQUIPMENT ***

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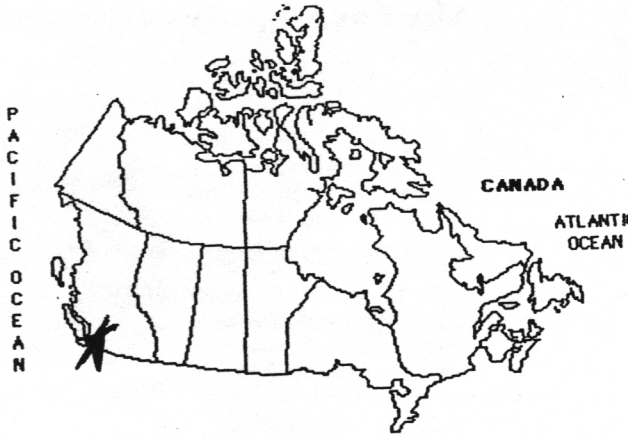

VSUG

The Vancouver Sinclair Users Group has been in existence since 1982. We are a support group for the owners and users of all SINCLAIR and TIMEX computers.

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